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- (54) Stand of a three-high cross rolling mill

Use: in the design of a stand of a cross rolling mill for pipes, profiles and short solids of revolution. The object is to make available an apparatus, which allows the capacity of the stand to be increased by shortening the repair time. This is achieved in that a support is provided for an open stand cover, which support has a pivotable roller stop with a lifting drive for the latter and a limiter fixed to the support, wherein the cover is not decoupled from the housing when it is opened. The stand of the three-high mill has a frame attached to a framework, which frame consists of a housing and a cover connected to the housing in an articulated manner, drums with working rollers arranged in the interior, a drive for opening the cover and a support for the cover. The support is provided with a pivotable roller stop, a stroke limiter for the roller stop and a lifting drive for the latter. The cover is provided with a supporting arm with a supporting face that makes contact with the support and with a rest that makes contact with the roller stop. A cylinder raises the roller stop into the upper position as far as the limiter in order for the replacement operation to be carried out. The released cover is pivoted by its cylinder by 130° until it makes contact with the roller stop. The cylinder then lowers the roller stop into the lower position and when the

cylinder is shut off the cover is pivoted under its own weight until it makes contact with the support and assumes the end position (180°). The drum assumes the vertical position and can easily be removed from the cover. Positioning the cover with a new drum in the working position takes place in the reverse order.

DESCRIPTION OF THE INVENTION

The invention relates to the field of metal rolling, specifically to rolling mills for producing pipes.

The invention can be used most effectively in the design of a stand of a three-high cross rolling mill for pipes, profiles and short solids of revolution.

A working stand of a three-high piercing mill is known, which stand has a frame consisting of a housing and a cover connected to the housing in an articulated manner, drums with rollers, a hydraulic drive for opening the cover and a support for the open cover.

The disadvantage of the design is the loss of time during the replacement operation, which is connected to the complexity of removing the drum with the roller from the open cover as a result of the inclined arrangement of the drum axis, which reduces the capacity of the rolling mill.

A stand of a three-high cross rolling mill is the closest of the known stands of a three-high rolling mill, according to technical nature. This stand has a frame consisting of a housing and a cover connected to the

housing in an articulated manner by means of rods of hydraulic cylinders, drums with rollers arranged in the interior, a hydraulic drive for opening the cover and a support for the open cover.

The disadvantage of the design is the necessity of opening the articulation in order to remove the cover from the housing during the replacement operation. As the axes/rods move in such a way when loaded by the weight of the cover that it is impossible to achieve an exact correspondence between the axes of the recesses of the cover and of the housing, the wear of the rods results in a leakage of fluid in the hydraulic cylinders and the necessity of frequent repairs.

The disadvantage also consists in the loss of time connected with the repair and maintenance of a large number of hydraulic cylinders (three) that operate during the replacement operation.

The loss of time connected with repair and maintenance leads to a reduction in the capacity of the rolling mill.

Also to be considered a disadvantage of this design is the considerable amount of space required owing to the necessity of opening the articulation and removing the cover from the frame.

The object of the invention is to make available an apparatus, which allows the capacity of the stand to be increased by shortening the time for repairing components of an articulation connecting the cover to the housing and shortening the time for maintaining a smaller number

of hydraulic drives, as well as to reduce the amount of space required.

The object set is achieved in that, in a stand of a three-high cross rolling mill, which stand has a frame consisting of a housing and a cover connected to the housing in an articulated manner, drums with working rollers arranged in the interior, a drive for opening the cover and a support for the open cover, according to the invention the support for the open cover is provided with a pivotable roller stop with a lifting drive for the latter and a limiter fastened to the support, and the cover is provided with a supporting arm with a supporting face that makes contact with the support and a rest that makes contact with the roller stop.

Configuring the design of the stand of the three-high cross rolling mill in this way allows the capacity to be increased by shortening the time for repairing components of an articulation connecting the cover to the housing and shortening the time for maintaining a smaller number of hydraulic cylinders.

This is achieved in that the opening of the cover by 180° occurs in two phases with an intermediate locked position with the aid of two hydraulic cylinders, without opening the articulation. After the cover has been opened by 130° by the main cylinder (phase 1), the cover opens by a further 50° and rests on the support (phase 2) by means of the pivotable roller stop, which makes contact with the rest on the stand cover, when the working spaces of the main cylinder are shut off.

In order to lock the cover securely in the intermediate position necessary for work and maintenance, the contact point of the cover with the roller stop, which is raised as far as the limiter, is selected in such a way that the limiter and not the hydraulic cylinder bears the load (including that of the weight of the cover).

Furthermore, configuring the design of the stand in this way allows production areas to be reduced by decreasing the width.

In the figures,

Fig. 1 shows the stand with a replacement mechanism in the working position;

Fig. 2 shows the subject matter of Fig. 1 in the intermediate position;

Fig. 3 shows the stand in the end position while the drums with the working rollers are being replaced.

The stand of a three-high cross roller mill has a frame attached to a framework 1, which frame consists of a housing 2 and a cover 5 which is connected to the housing in an articulated manner by means of tie rods 3 and wedges 4, drums 6 with working rollers 7 arranged in the interior, a drive for opening the cover and a support 8 for the open cover 5.

The support 8 for the open cover 5 is provided with a pivotable roller stop in the form of a two-armed lever 9 and a roller 10, a stroke limiter 11 for the roller stop

and a lifting drive for the latter in the form of a cylinder 12, which is fixed in the support 8 in an articulated manner.

The cover 5 is provided with a supporting arm 13 with a supporting face a, which makes contact with the support 8 and a rest 14, which makes contact with the roller 10 of the stop.

The drive for opening the cover is in the form of a cylinder 15, which is fixed in the support 8 in an articulated manner.

The roller stop is raised by the cylinder 12 into the upper position as far as the limiter 11 in order for the replacement operation to be carried out. The wedges 4 are knocked out of the tie rods 3 and the released cover 5 is pivoted by 130° by the cylinder 15 until the rest 14 of the cover makes contact with the roller 10 of the roller stop, after which the pressure in the cylinder 15 is relieved.

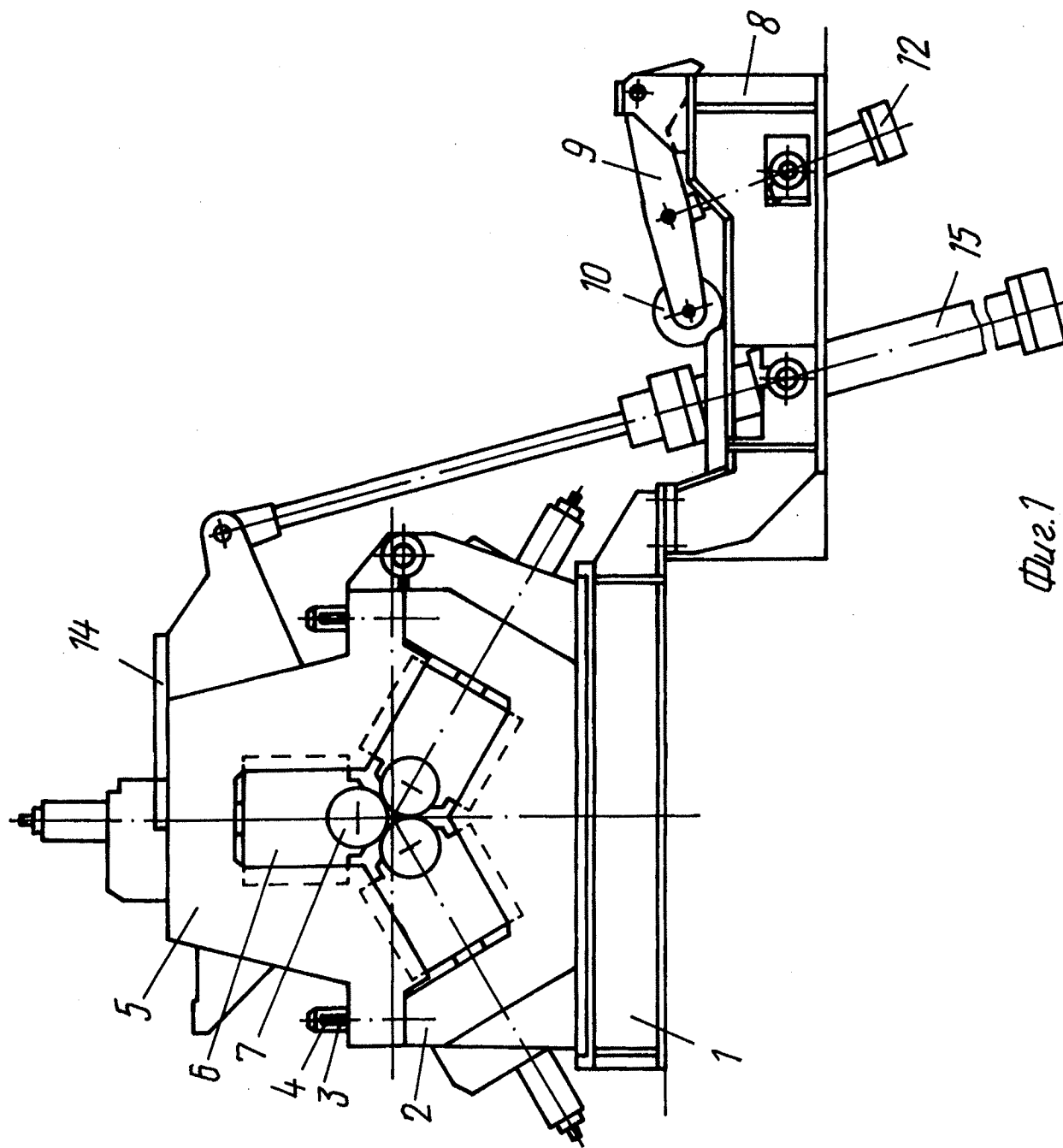
After the drum 6 has been manually decoupled from its sliding mechanism (not shown), the roller stop is lowered into the lower position by the cylinder 12. The cover 5 is pivoted under its own weight until the supporting face a of the supporting arm 14 makes contact with the support 8, without losing contact with the roller 10 and while pulling the piston rod of the cylinder 15 after it, and assumes the open end position (180°). The drum 6 assumes the vertical position and can easily be removed from the cover 5.

The drums with the rollers arranged in the stand housing are easily replaced. The cover 5 is installed with a new drum into the working position in the reverse order. The cover 5 is raised by the cylinder 12 into an intermediate position when there is no pressure in the cylinder 15. After the drum 6 has been coupled, the cover 5 is returned to the starting position by the cylinder 15 and the roller stop is lowered.

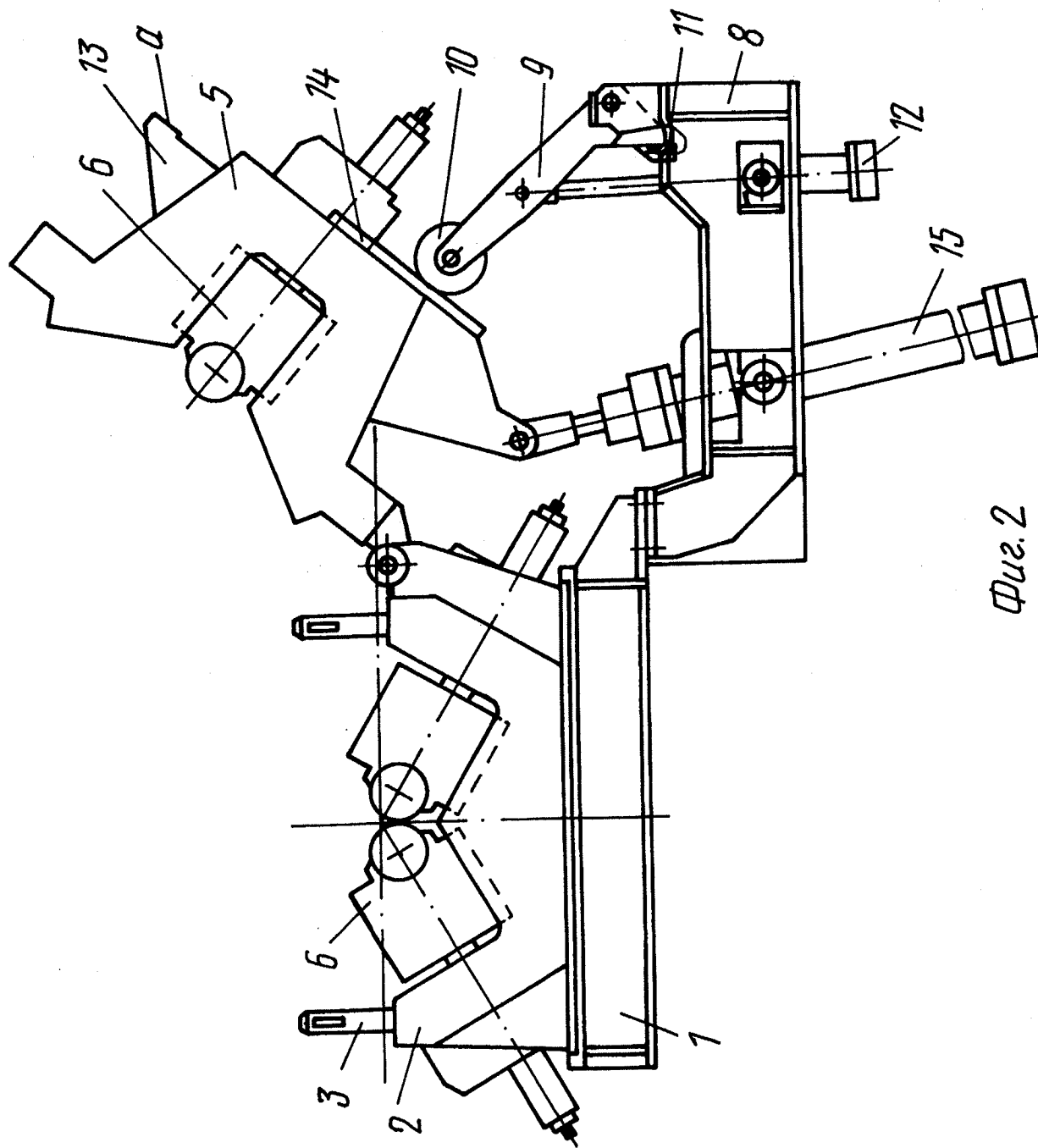
Compared with the known stands, the proposed stand of the three-high cross rolling mill allows the capacity of the mill to be increased by shortening the time for repairs and for maintaining a smaller number of hydraulic drives, as well as the production area taken up to be reduced.

PATENT CLAIM

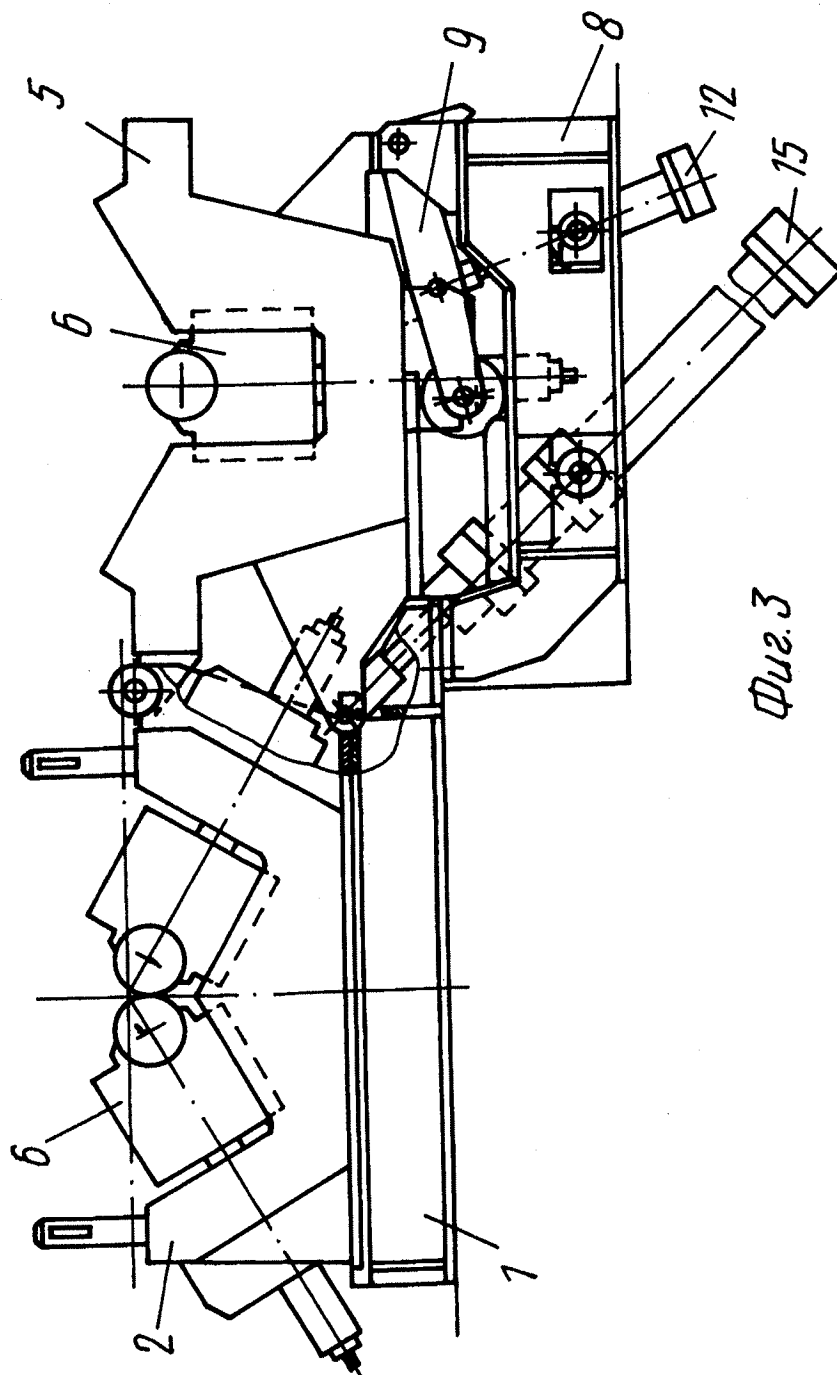
Stand of a three-high cross rolling mill, comprising a frame consisting of a housing and a cover connected to the housing in an articulated manner, drums with rollers arranged in the interior, an opening drive and a support for the open cover, characterised in that the support for the open cover is provided with a pivotable roller stop with a lifting drive for the latter and a limiter fixed to the support, and the cover is provided with a supporting arm with a supporting face that makes contact with the support and a rest that makes contact with the roller stop.



Фиг. 1



Фиг. 2



Фиг. 3